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Artillery and Counterinsurgency: The Soviet Experience in Afghanistan

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The leverage that technology offers depends on the circumstances which shape combat such as the theater, the opponent and the objective. Guerrilla war, a test of national will and the ability to endure, negates many of the advantages of technology. The Russian Army, and its predecessor--the Soviet Army, fought the most-recent, large-scale counterinsurgencies pitting technologically-advanced mechanized forces against dedicated guerrillas. The Russians are publishing many of their lessons learned now. Although some of these have no direct application to the United States Army, others do and military professionals need to be aware of how other militaries attempt to solve contemporary problems.

The Soviet Army invaded Afghanistan on Christmas Eve 1979 with TO&E divisions equipped and trained to fight conventional, maneuver warfare on rolling plains. They came to replace an ineffective communist leader, not to fight an insurgency. They planned to stabilize the situation, occupy garrisons and assist the Afghanistan government while the Afghan government forces fought the guerrilla resistance.¹ Soon, however, "mission creep" set in and Soviet forces were locked in a counterinsurgency fight in rugged mountains and desert--a fight for which they were neither equipped nor trained. The technologically-superior Soviet Ground Forces were trained to rely heavily on massed artillery, firing normative fires², to shatter the defenses of a stationary enemy prior to the attack. The Mujahideen guerrilla did not accommodate the Soviet gunners by occupying linear defenses or staying in place. Throughout the war, the Soviet Army continued to rely on artillery and close air support as a substitute for ground maneuver and close combat. The Soviet 40th Army needed lots of light infantry, but chose instead to expend massive firepower in order to save soldiers' lives and to compensate for their lack of infantry. It was an expensive, indiscriminate and ineffective policy.³ However, as the war progressed, the Soviet combatants adapted their tactics, training and force structure to fight the Mujahideen and artillery played a significant role in their evolving counterinsurgency tactics, techniques and procedures.

The God of War' crosses into Afghanistan

Artillery, the Russian "God of War", was a dominant part of Soviet ground combat power. Many analysts described Soviet ground forces as an artillery army with a lot of tanks. The Soviet divisions brought their tanks and artillery to Afghanistan--where the tanks proved of limited value. The artillery proved of greater value, but the target set presented by the Mujahideen was often difficult to engage and of limited tactical value. Soviet firing tables and norms were developed for high-intensity war fought on relatively flat terrain by mechanized forces against mechanized forces.⁴ Faced with a different war on different terrain and a different enemy, Soviet gunners initially had difficulty in quickly engaging targets since the 'hip shoot' was not a normal mission. Soviet artillery planning was designed to physically obliterate defending forces within square hectares by normative fires involving hundreds of rounds massed in a small area. When the Soviet gunners used these normative fires in Afghanistan, they had little impact on the guerrillas.⁵ During the course of the war, the Soviet artillerymen developed new firing techniques, nomographs⁶ and firing tables to cope with the enemy, mountains and desert. They found that new technology, such as precision-guided munitions and scatterable mines, offered some tactical advantages but no decisive advantage in counterinsurgency. They found that mortars were frequently better than howitzers in hitting caves and terrain folds. Howitzers were usually of more value than gun/howitzers and guns in the mountains. Multiple rocket launchers (MRLS) were particularly effective against dismounted Mujahideen. A constant problem was detecting targets which could be rapidly and effectively engaged. Throughout the war, the Soviet gunners were hampered by a lack of effective tactical intelligence which could rapidly identify a viable target set and pass the data to the guns before the target disappeared.

Support of large-scale operations

Artillery planning in support of large-scale operations in Afghanistan was the most similar to regular Soviet artillery planning. Artillery planners would form regimental artillery groups (RAGs), brigade artillery groups (BrAGs), division artillery groups (DAGs) and Army Artillery Groups (AAGs) as needed.⁷ The Soviet Army used massed artillery to suppress or destroy enemy positions and to seal the area and prevent escape by firing remotely delivered mines onto escape routes. The Soviet commanders started each sweep with an artillery preparation and advanced in contested areas behind a wall of artillery fire. Despite proclamations to the contrary, they apparently showed little concern for the civilian population and used artillery indiscriminately in and around villages.⁸

Support of tactical units

Soviet artillery missions in Afghanistan included counterbattery, artillery preparation and support, blocking fire, sweeping fire in blocked areas, harassing and interdiction fire, illumination support and direct fire.⁹ Counterbattery was often ineffective. Approximately 85% of the Soviet force was usually engaged in some form of security. Forces guarded base camps, airfields, LOCs, cities, district headquarters, garrisons, depots, and government facilities which the Mujahideen frequently attacked with mortars

and rockets. The Mujahideen would fire and move before Soviet counterbattery could respond. Artillery positioned in firebases supported defensive security missions in a general support role. These fire bases were mutually supporting and located 10-15 kilometers apart.¹⁰

Soviet offensive artillery support included general support, reinforcing and attached. The artillery fired to protect march columns, to protect advances, to prepare for attacks in cities and villages, to support block and sweep missions, and to provide indirect and direct fires during combat. When regiments and brigades went on the offensive, they employed their organic artillery and any artillery positioned within supporting range. Artillery attached to a regiment or brigade was usually reattached in direct support of a battalion. When artillery was attached in direct support, the most common attachment was an entire artillery battalion to a maneuver battalion.¹¹ Sometimes a howitzer battery and a MRLS battery might support a maneuver battalion. Often Soviet commanders would attach a battery to a separate maneuver company. Mortars, which were part of Soviet artillery, were often attached to maneuver companies. The 82mm Vasilek automatic mortar batteries, which have both an indirect and direct fire capability, were particularly welcome by maneuver units.¹²

Soviet artillery protected maneuver units during movement. Prior to movement to contact, Soviet artillery planners learned to plan fires on likely ambush spots. Further, should the Soviet force have to move through a narrow valley or defile, artillery planners would plan parallel barrage fires along the axis of advance some 300-400 meters away from the road. Should several artillery groups be supporting the advance, they could create a continuous fire corridor to protect the advancing force.¹³

The Soviet Army used large quantities of artillery fire to protect advancing forces. One Soviet airborne battalion decided to advance behind tanks and personnel carriers through a narrow, 14-kilometer-long forested zone to clear it of Mujahideen. The tanks and personnel carriers would protect his dismounted paratroopers. However, the Mujahideen had RPG-7 antitank grenade launchers which endangered the vehicles. The paratroop battalion had an artillery battalion attached. An artillery officer from a battery moved with each paratroop company to adjust fire. The artillery kept a protective wall of fire in front of the ground force as it slowly advanced through the area. The indirect artillery fire and the direct fire of the armored vehicles protected the Soviet men and vehicles and prevented the Mujahideen from taking carefully aimed shots. During the course of the three-day advance, the defending Mujahideen fired over 40 RPG rounds at the vehicles, but did not seriously damage any of them.¹⁴

The Soviet combatants used artillery preparations before attacking into cities and villages. Their indirect artillery fire hit suspected guerrilla strongholds and assembly areas while direct fire artillery hit snipers and firing points. Artillery also fired blocking fires or scatterable mine fields to seal the populated area to prevent escape or reinforcement. Consequently, civilian casualties were high and current Russian assessments recommend using precision-guided munitions, antitank guided missiles with fragmentation warheads and artillery rounds with a reduced bursting radius to reduce civilian casualties in future city fighting. Unlike conventional Soviet attacks which conducted artillery fires by phases and a time schedule, the Soviet planners learned that city fighting could not stick to a time schedule and they only used on-call fire support to

the attacking force. They also learned to use blocking fires to help secure areas just cleared or to prevent counterattacks.¹⁵

The Soviet combatants used artillery to support block and sweep (search and destroy) missions designed to find guerrillas in the countryside. Again, they used artillery to seal flanks through which the guerrillas might escape. Sweeping fire¹⁶ preceded the searching Soviet ground forces even when there was no indication that the Mujahideen were present. Further, Soviet artillery concentrated on mountain passes, gorge exits and road or trail intersections when supporting a ground maneuver unit.¹⁷

In theory, all Soviet combat arms officers could adjust indirect artillery fire, but practice constantly demonstrated that non-artillery officers were not up to the challenge or not trusted to do so. Commanders refused to authorize indirect fire support adjusted by maneuver officers unless they knew their *exact* position (cases exist where maneuver commanders knew their position to within 50 meters, but were denied needed indirect artillery fire support).¹⁸ Further, the number of forward observers and fire direction officers assigned by TO&E were not enough to support forces deployed in a counterinsurgency. Forward observers had to be located within battalions and separate companies.¹⁹ Fire direction officers had to be available to accompany separate firing batteries and separate firing platoons since the terrain could not always accommodate an entire artillery battalion--the base artillery planning unit of the Soviet Army. Since the artillery battalion was the base unit, Soviet artillerymen were not used to deploying split-FDCs--a requirement in the rugged terrain of Afghanistan. The Soviet Army never could train its maneuver officers sufficiently to solve its indirect-fire-adjustment problem, so they solved it by assigning additional forward observers and fire direction officers from the Soviet Union throughout the war.

Maneuver officers could, however, readily adjust direct, observed fire and direct fire was a common offensive mission for artillery attached to maneuver units. Armored, self-propelled artillery was preferred for direct-fire missions, but towed or unarmored artillery was also used in this role. The unarmored BM-21 multiple-rocket launcher was often used when other direct fire failed to dislodge the enemy. The truck-mounted BM-21s were usually moved into direct firing positions under the protection of an air strike and each fired their forty 122mm rockets immediately after the air strike ended. The surviving guerrillas in the impact area were normally unable or unwilling to return fire on the BM-21s as they pulled out of the firing position to reload.²⁰

Support of battalion and company raids

The 2S1 122mm self-propelled howitzer and 2S9 120-mm self-propelled howitzer/mortar were best suited to support raiding motorized rifle or air assault forces. They usually deployed by battery or battalion. Prior to the raid, the Soviet planners determined initial targets from aerial, visual and artillery reconnaissance. They usually fired a three-five minute artillery preparation on those targets. Should the Mujahideen open fire on the Soviet forces in the course of the raid, the Soviet gunners would attempt to quickly engage the target before it could escape by registering with one or two ranging rounds and then firing massed artillery fires on the target using normative firing tables for suppression or assured destruction. While pitched battles occurred, the most common activity for raiding Soviet forces was pursuit of a withdrawing enemy. Mujahideen would

usually leave a rear guard to slow down the attacker while the main body escaped. The rear guard would try to stay within 200-300 meters of the Soviet force to escape Soviet air and artillery. In that case, the Soviet forward observer would spot his first round some 200 meters beyond the enemy and then walk the rounds back onto the enemy.²¹ Once the Soviet leadership introduced the laser-guided "Smel'chak" [dare-devil] mortar round into Afghanistan, the massive 2S4 self-propelled 240mm mortar proved effective in destroying Mujahideen strongpoints and fortifications located in caves and terrain folds that howitzers could not hit. In June 1985, Senior Lieutenant A. Beletskiy employed his 2S4 battery against a Mujahideen stronghold that artillery could not engage. The stronghold was located near the Pandshir valley and garrisoned by Mujahideen of Ahmed Shah Masood. Lt. Beletskiy used a laser range finder to determine that the distance from the target was 2350 meters. He then fired a conventional HE round spotting round--evidently to establish the PGM footprint. He adjusted his firing data and then fired a ground laser-guided "Smel'chak" round. It hit the target exactly. The 2S4 battery destroyed the Mujahideen stronghold with just twelve rounds.²²

Breaking contact and withdrawal

Soviet forces, particularly airborne and air assault forces, were at risk when their advance ended and they started to withdraw from the mountains. Mujahideen would follow closely on their heels to avoid artillery and direct-fire support, occupy abandoned positions and shoot at the retreating force. Artillery fire support became a standard way to allow a Soviet force to break contact and withdraw. Before the Soviet force began to withdraw downhill, Soviet artillery would hit the reverse slope of the mountain crest that the Soviet force was on as well as the flanking slopes of mountains possibly occupied by the enemy and surrounding peaks and trails. As the Soviet force began to withdraw, Soviet artillery fire would shift to the crest of the mountain that the Soviet force was on. As the Soviet force withdrew, Soviet artillery fire would gradually shift downhill in a series of lines some 150-200 meters apart. The Soviet artillery would continue to hit the mountain and its surroundings until the Soviet maneuver force had completed its descent and was some three kilometers from possible Mujahideen small-arms fire.²³

Artillery ambush

The Soviet gunners used towed artillery, such as the D-30 122mm howitzer, MT-12 100mm antitank guns and vehicle-mounted antitank guided missiles to provide base camp security as well as to protect outposts and government installations. Artillery observers, usually located on high ground, found targets and adjusted fire during the day. At night, target acquisitions and engagements were difficult, but Soviet reconnaissance employed their "Realii-U" seismic sensor system to detect unobserved targets. The *Realii-U* is a seismic motion detector which allows the operator to determine the number and type of objects moving near it. The Soviet planners used the *Realii-U* to aid in the defense, monitor the security zone and to support the artillery ambush.²⁴

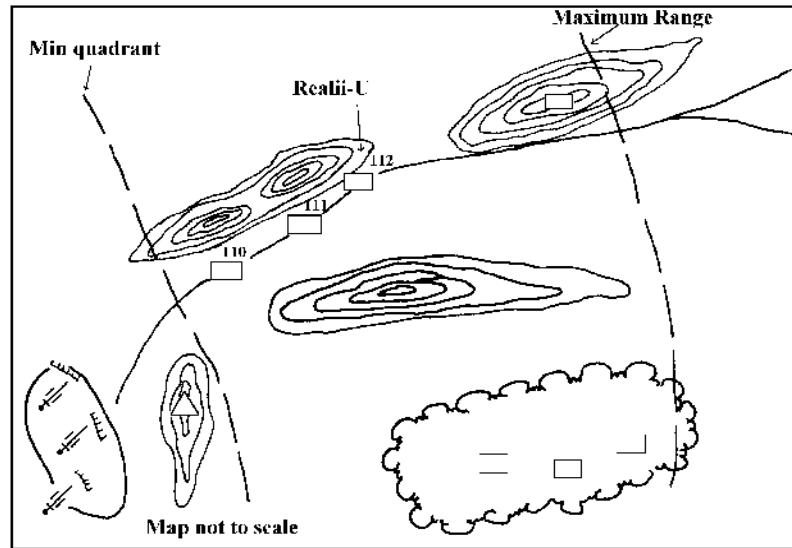


Figure 1 - Artillery Ambush. The Russians used the Realii-U seismic motion sensor to detect unobserved targets. Shown here is an actual plan for such an ambush. Fire concentrations were plotted (110, 111 and 112) along a Mujahideen supply trail out of view from the observation post (OP). When the Realii-U detected enemy movement, the Russians fired the concentrations.

A D-30 122mm howitzer platoon leader conducted a successful artillery ambush in February 1986 near the town of Talukan in the northeast province of Takhar. Lieutenant V. Kozhbergenov installed the *Realii-U* sensor near a Mujahideen supply trail that he could not directly observe from his platoon observation post. (Figure 1) He then plotted three artillery concentrations (110, 111, and 112) along the trail and computed the firing data for each. The concentrations were spaced 100-150 meters apart. The platoon leader plotted his concentration 111 at the narrowest part of a valley. He then periodically used the DMK assault meteorological set to calculate the Meteo 11 report to adjust his data (the Meteo 11 report is good for an hour).²⁵

At night, the *Realii-U* operator reported that some 10-15 people, two trucks and five pack animals were passing through concentration 112. The platoon leader ordered "Fire Mission". His gunners stood by their pieces. As the Mujahideen approached concentration 111, the gunners fired a volley into concentration 111. Then, the first piece switched to fire concentration 110 and the third piece switched to fire concentration 112. Number two gun continued to fire on concentration 111. The platoon expended twelve rounds and killed two Toyota trucks, four pack animals and six men as well as destroying small arms and ammunition.²⁶

Soviet commanders also planned artillery fire in support of ground ambushes. Ground ambush planning often included artillery illumination fire, fire on the kill zones, fire on probable enemy assembly areas after their withdrawal from the kill zone and fires to break contact with the enemy.²⁷

Convoy security

The Soviet primary lines of communication stretched over 1600 kilometers across inhospitable terrain. Almost all Soviet supplies traveled over a tenuous road network that tied down 15 of the 93 battalions of the Soviet 40th Army in perpetual LOC security. Other battalions provided convoy and march security to the vehicles that slowly drove from the Soviet border to the forward garrisons and back.²⁸ Artillery contributed to LOC security by *convoy escort* and *fire support and accompaniment*.

The Soviet commanders dispersed self-propelled artillery, together with tanks and armored personnel carriers, throughout the march column. These weapons systems remained within direct fire support distance of each other. Should the Mujahideen ambush the column, the artillery pieces, tanks or armored personnel carriers within the kill zone would stop and return fire while the trucks would try to drive out of the kill zone.²⁹ Artillery pieces have advantages over tanks in mountainous terrain since their main gun tubes have far greater elevation.

Artillery assigned in fire support and accompaniment moved with the column in three groups (normally batteries, but sometimes battalions). The first group moved at the head of the column, the second in the middle of the column and the third at the end. Artillery forward observers were spaced every 10-15 vehicles throughout the column. This spacing ensured continuous fire support, even when gaps developed. As the column started to march, the artillery stationed at the start point provided initial support. As the column reached the maximum effective range of the supporting artillery, the second artillery group would deploy into firing positions. This deployment was usually at an outpost located within the artillery fan of the supporting artillery. The second group would then provide fire support as the third artillery group leap-frogged forward to the middle of the column. As the end of the column passed the second artillery group, the head of the column would near the maximum effective range of the second artillery group. The third artillery group would then occupy firing positions and the second firing group would rejoin the column. The Soviet artillery would continue this procedure until the column closed into an assembly area.³⁰

The Mujahideen usually tried to ambush a convoy near the front to stop it and destroy forward control elements. When possible, the Mujahideen would cut a convoy into pieces and try to destroy the pieces systematically. The forward positioning of the first artillery group often allowed that group to engage the ambushing force by direct fire. Forward observers would also call in indirect fire on the ambush in an effort to defeat or annihilate the attacker.³¹

Conclusion

The Soviet generals attempted to substitute fire power for ground maneuver. The Soviets did not deploy enough infantry to Afghanistan and most of their infantry were motorized rifle forces who were hard-pressed to fight far from their carriers. The Soviet leadership needed to use infantry aggressively to engage the Mujahideen and prevent their withdrawal, but Soviet political decisions, security duties and force structure prevented assigning sufficient, trained light infantry to conduct offensive mountain combat. Soviet gunners tried to pick up the slack and lost 433 artillery pieces and mortars fighting the Mujahideen.³² But fire without maneuver cannot be decisive.

There are some lessons that the US artilleryman should take from the Soviet experience in Afghanistan. First, counterinsurgency requires innovative thinking and constant examination of tactics in order to get steel on the target accurately and rapidly. Second, maneuver units and artillery must cooperate even more closely than in conventional warfare and must be tightly integrated at all times. Third, direct fire is a viable offensive firing technique--not just a defensive measure taken when enemy are in the wire. Fourth, artillery assets can play a major, active role in convoy escort and accompaniment in rugged terrain. Fifth, cities, towns and villages will have civilians in them and gunners will have to develop techniques to fight around them. Sixth, precision-guided munitions and other specialty rounds have an increasing role in counterinsurgency. Seventh, the biggest problem artillery has in counterinsurgency is finding a viable target. During the course of the war, the Soviet gunners developed new firing techniques, nomographs and firing tables to cope with the enemy, mountains and desert, but it was not enough to defeat the Mujahideen decisively. In the end, the Mujahideen national will and their ability to endure was decisive and the Soviet Army withdrew after fighting for over nine years. The Soviet Army, beset by the effects of a collapsing empire and faced with overwhelming economic catastrophe, apparently decided that they would not fight future counterinsurgencies, but would only prepare for high-technology, conventional maneuver war. This decision to avoid guerrillas was in vain, however, since Soviet, and later Russian, forces again had to fight guerrillas in Tadjikistan, Azerbaidjan, Georgia and Chechnya. The Russians had to relearn the bitter lessons of Afghanistan, since they had not been studied and incorporated in the turbulent interim. Russian military science is now wrestling with conflicting visions of future war and perhaps the lessons of Afghanistan and the other guerrilla wars are finally being incorporated.

Endnotes

1. Aleksandr A. Lyakhovskiy, *Tragediya I doblest' Afghana* [The tragedy and valor of the veterans of Afghanistan], Moscow: Iskona, 1995, 116. General Lyakhovskiy served with the General Staff Operations Group supporting the Soviet 40th Army during 1987-1989.[BACK](#)

2. Normative fires are the number of expended rounds required to guarantee mission accomplishment. These are mathematically and field-test proven and are expressed as the numbers of rounds fired by type of artillery system within a specified period of time to produce a guaranteed percentage of kill. Soviet artillery missions are assigned in terms of annihilation, destruction, neutralization and harassment fires. The first three missions are given in normative fire terms. *Annihilation [unichtozheniye]* consists of inflicting such losses or damage on a target that it completely loses its combat effectiveness. In the annihilation of unobserved targets, fire is conducted until a designated number of shells is expended which assures a 70-90% kill probability of individual targets or the mathematical expectation of 50-60% of targets destroyed in a group target. (The implication is that the target is so damaged that it cannot be reconstituted and is incapable of even token resistance).

Destruction/demolition [razrusheniye] consists of putting a target in an "unfit" condition. (The implication is that the target is so damaged that it cannot be reconstituted without a

significant expenditure of time and resources, and is capable only of sporadic and uncoordinated resistance).

Neutralization/suppression [podavleniye] involves inflicting such losses on a target and creating such conditions by fire that it is temporarily deprived of its combat effectiveness, its maneuver is restricted or prohibited, or control is disrupted. In neutralizing an unobserved group target, the expenditure of a norm of rounds assures the mathematical expectation of 30% of the targets destroyed. (The implication is that the target is severely damaged, but would be capable of eventual coordinated resistance after the suppression fire is lifted). From G. E. Peredel'skiy & M. P. Kankov, *Artilleriyskiy divizion v boyu* [Artillery battalion in combat], Moscow: Voenizdat, 1989, 20-21.

For example, annihilation normative fire against a single artillery piece is 300 rounds of 122mm howitzer ammunition, 200 rounds of 152mm howitzer ammunition or 360 rounds of 122mm multiple rocket launcher ammunition. Neutralization normative fire against an enemy strongpoint occupying one hectare of ground is 200 rounds of 122mm howitzer ammunition, 150 rounds of 152mm howitzer ammunition or 240 rounds of 122mm multiple rocket launcher ammunition. Extracted from tables in V. Ya. Lebedev, *Spravochnik ofitsera nazemnoy artillerii* [Field artillery officer's handbook], Moscow: Voenizdat, 1984, 373-375. [BACK](#)

3. Lester W. Grau, *The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan*, Washington: NDU Press, 1996, 52. [BACK](#)

4. Lester W. Grau, "Soviet Artillery Planning in the Tactical Defense", Fort Leavenworth: Soviet Army Studies Office, 1990. [BACK](#)

5. Soviet-style normative fires proved very effective when the Mujahideen reverted to conventional tactics. After the Soviet withdrawal, the communist Afghan government forces unexpectedly held on for several years. The Mujahideen guerrillas adopted conventional linear tactics to attempt to take the cities of Kabul and Jalalabad. The communist forces, using normative artillery fires, decimated the Mujahideen and delayed a Mujahideen victory by at least a year. See Makhmut Akhmetovich Gareev, *Moya poslednyaya voyna* [My final war], Moscow: Insan, 1996, 232-233, 248. [BACK](#)

6. Nomographs are planning charts showing numerical relationships. The Soviets had literally hundreds of tactical nomographs which allowed commanders or staffs to make rapid determinations of march times, the most effective systems for rapid artillery annihilation of an area target, the length of time a firing position can be safely occupied during a firing mission, etc. Most of the nomographs changed due to the terrain of Afghanistan. [BACK](#)

7. Grau, *The Bear....*, 20, 37, 50, 61, 68, 79, 82, and 90. Occasionally, due to terrain or range considerations, artillery groups would split--an uncommon occurrence for regular Soviet forces in Europe, but a common one for US artillery. [BACK](#)

8. Ibid, 44-46, 75-76. [BACK](#)

9. M. I. Karatuev, V. A. Dreshchinskiy, "Primenenie artillerii v lokal'nykh voynakh I vooruzhennykh konfliktakh" [Employment of artillery in local wars and military conflicts], *Voennaya mysl'* [Military thought], May-June 1996, 26-27. [BACK](#)
10. Ibid, 28.[BACK](#)
11. Grau, *The Bear....*, 3, 25, 45, and 71.[BACK](#)
12. In the Soviet Ground Forces, mortars, antitank guns and antitank guided missiles were artillery weapons. Artillerymen were integrated into motorized rifle battalions to operate the organic mortars and antitank systems.[BACK](#)
13. Karatuev, 26.[BACK](#)
14. Grau, *The Bear....*, Ibid, 24-26.[BACK](#)
15. Karatuev, 27. [BACK](#)
16. Sweeping fire is an offensive rolling barrage with lessened densities of frontage. In a regular offensive rolling barrage, the Soviets used one artillery piece of 100mm or larger for every 25 meters of frontage for the rolling barrage. Sweeping fire could double or triple that frontage.[BACK](#)
17. Karatuev, 27-28.[BACK](#)
18. Grau, *The Bear....*, 15-18.[BACK](#)
19. Boris V. Gromov, *Ogranichenny kontingent* [Limited contingent], Moscow: Progress, 1994, 186-187. General Gromov served three two-year tours in Afghanistan, the last as Commander, 40th Army during its withdrawal.[BACK](#)
20. Grau, *The Bear....*, 48-52.[BACK](#)
21. Viktor Litvinenko, "Novo to, chto khorosho zabyto" [What is completely forgotten is brand new], *Armeiskiy sbornik* [Army digest], September 1996, 46. Colonel Litvinenko commanded an artillery regiment and was the chief of the 201st Motorized Rifle Division artillery during 1984-1986 in Afghanistan.[BACK](#)
22. Ibid.[BACK](#)
23. Ibid, 45-46.[BACK](#)
24. Litvinenko, 44.[BACK](#)
25. Ibid.[BACK](#)

26. Ibid.[BACK](#)
27. Grau, *The Bear*...., 180-184, 189, and 192.[BACK](#)
28. Lyakhovskiy, conversations with the author.[BACK](#)
29. Litvinenko, 44.[BACK](#)
30. Ibid, 44-45.[BACK](#)
31. Ibid, 45.[BACK](#)
32. Lyakhovskiy, appendix.[BACK](#)